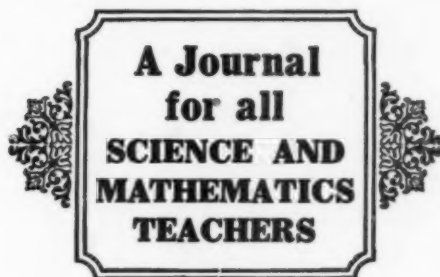


SCHOOL SCIENCE AND MATHEMATICS

FOUNDED BY C. E. LINEBARGER



INDEX to VOLUME XXXIV 1934

Published by THE CENTRAL ASSOCIATION OF SCIENCE AND MATHEMATICS TEACHERS, INC.
Publication Office: 450 ARNAIP ST., MENASHA, WISCONSIN

Business Manager: 450 Ahnaip St., Menasha, Wis., and 3319 North Fourteenth St., Milwaukee, Wis.

Editorial Office: 7633 CALUMET AVENUE, CHICAGO, ILLINOIS

Published Monthly, October to June, Inclusive, at Menasha, Wisconsin. Price \$2.50 per year: 35 cents per copy. Entered as second class matter December 8, 1932, at Menasha, Wisconsin, under the Act of March 3, 1879.

100

Glen
Waller

INDEX BY TITLES

A

Acid-Resisting Cement of Sulphur and Sand.....	918
Advertisements as a Teaching Device in General Science. ROBERT B. COLVIN.....	79
Airless Bricks.....	966
Alaskan Glacier Advances While all Others Retreat, One. SCIENCE SERVICE..	283
Algebra Test, An. JAMES DAVID TELLER.....	496
Algebra, An Experimental Comparison of Two Methods of Teaching Elementary. MARGUERITE LINN.....	983
Alphabet, Another. ROSS MCCONNEHEY.....	71
Alternations of A.C. Current, Demonstrations of the. PAUL E. WILSON.....	968
Amendments to the By-Laws of the Central Association of Science and Mathematics Teachers.....	692, 802
American Optical Apparatus Now Superior.....	1012
Ammonia System of Compounds, The. HENRY WOLTHORN.....	65
Animal Gifts, Some. W. G. VINAL.....	464
Annual Convention, Central Association of Science and Mathematics Teachers, 34th. KATHARINE ULRICH.....	803, 880
Arithmetic, How to Study. MARGARET R. WALTERS.....	848
Atom, Computing the Exact Mass in Grams of an. DONALD L. COLE.....	958
Atoms in Action. W. T. SKILLING	
No. I. Exploding Atoms.....	737
No. II. Construction and Destruction of Atoms.....	825
No. III. The Sleeping Energy of Atoms.....	962

B

Baking and Chemistry Teaching. VICTOR E. MARX.....	284
Big Gathering of Saps in the Cuyahoga Country.....	307
Biological Terms. ARTHUR H. BRYAN.....	773
Biology, A Study of the Effect of a Course in High School Biology on Performance in College. BERT CUNNINGHAM.....	578 ✓
Biology Courses of Study, Subject Matter Topics in. NORMAN E. WEBB AND W. G. VINAL.....	829
Biology Department Meetings to Coordinate Instruction and Improve the Quality of Teaching. A. H. BRYAN.....	609
Biology, Plastic. ALFRED F. NIXON.....	967
Biology Teacher, The Mission of the. H. E. STORK.....	473
Biology Teaching, Experimental Practices in. J. WAYNE WRIGHTSTONE.....	491
Biology Test. SAMUEL STRAUSS.....	892
Biology Test—Prehistoric Animal. SAMUEL STRAUSS.....	543
Bird No Bigger Than Bee Found in Haitian Uplands. SCIENCE SERVICE.....	222
Black Hills Science Club, The. ARTHUR W. SCHMIDT.....	678
Bohemium, "Heaviest Element," All a Mistake, Declares Yugoslavian Scientist, Claim to Discovery of.....	701
Books Received. GLEN W. WARNER.....	103, 318, 440, 554, 674, 778, 893, 1006
Book Reviews:	
A Combined Laboratory Manual and Workbook in Biology. JEROME ISENBARGER.....	325
A First Book in Chemistry. FRANK B. WADE.....	442
A General Science Workbook. F. R. BEMISDERFER.....	444
Amateur Telescope Making. CLARENCE RADIUS.....	323
An Elementary Treatise on Differential Equations. J. M. KINNEY.....	330
An Introduction to the Teaching of Science. IRA C. DAVIS.....	550
A Textbook of General Botany for Colleges. W. WHITNEY.....	1011
A Textbook of Organic Chemistry. FRANK B. WADE.....	895
A Textbook of Physics. Vol. II. Heat and Sound. GLEN W. WARNER.....	106
A Textbook of Physics. Vol. III. Electricity and Magnetism. GLEN W. WARNER.....	321
Brief Course in Plane and Spherical Trigonometry. J. M. KINNEY.....	328
College Physical Science. GLEN W. WARNER.....	444
College Physics. F. G. TUCKER.....	319
Differential and Integral Calculus. J. M. KINNEY.....	898
Differential Equations. J. S. GEORGES.....	548

Electrons at Work. GLEN W. WARNER.....	673
Eleventh Year Mathematics, Intermediate Algebra and Trigonometry. GEORGE L. ROYCE.....	328
Essentials of Plane Trigonometry and Analytic Geometry. J. M. KINNEY.....	898
Exercises in First Year Algebra. GEORGE E. HAWKINS.....	896
Experimental Optics. LOWELL C. WARNER.....	212
First Year Algebra. JOSEPH A. NYBERG.....	211
Foundations of Physics. CLARENCE RADIUS.....	895
Great Men of Science. GLEN W. WARNER.....	210
Handbook of Chemistry and Physics. 18th Edition. GLEN W. WARNER.....	106
Handbook of Chemistry and Physics. 19th Edition. GLEN W. WARNER.....	1010
Handbook of Frogs and Toads. IRA C. DAVIS.....	552
High School Chemistry. FRANK B. WADE.....	210
How the World Lives and Works. H. S. TURNER.....	672
Intermediate Algebra. G. L. ROYCE.....	784
Introduction to Biology. JEROME ISENBARGER.....	326
Introductory Physics. GLEN W. WARNER.....	322
Mastery Experiments and Problems for Science Classes and Science Clubs. W. F. ROECKER.....	552
Mathematical Essentials for Elementary Statistics. J. M. KINNEY.....	898
Mechanics and Applied Heat. C. RADIUS.....	442
Moulders of the American Mind. MAURICE H. KROUT.....	108
New Biology. ROSE A. PHILLIPS.....	900
New High School Arithmetic. C. A. STONE.....	324
Physical Optics. GLEN W. WARNER.....	550
Plane and Spherical Trigonometry. J. M. KINNEY.....	898
Plane Trigonometry. C. A. STONE.....	324
Plane Trigonometry With Tables. GEORGE E. HAWKINS.....	548
Plants Useful to Men. W. WHITNEY.....	104
Progressive First Algebra. G. L. ROYCE.....	786
Progressive Second Algebra. G. L. ROYCE.....	786
Provision for Individual Differences, Marking and Promotion. JOSEPH A. NYBERG.....	323
Review of Pre-College Mathematics. GLEN W. WARNER.....	1011
Second Year Algebra. C. A. STONE.....	548
Sex in the Plant World. W. WHITNEY.....	104
Signals and Speech in Electrical Communication. GLEN W. WARNER.....	672
Study Guides and Unit Tests. L. F. FOUNTAIN.....	325
Tables of Higher Mathematical Functions. Vol. I. J. M. KINNEY.....	896
The Administration of Mathematics in Secondary Schools. J. S. GEORGES.....	320
The Biology of Bacteria. JEROME ISENBARGER.....	671
The Collared Lizard. J. F. SCHUETT.....	1010
The Discovery of the Elements. FRANK B. WADE.....	894
The Elements of Euclid. J. M. KINNEY.....	326
The Endless Quest, Three Thousand Years of Science. GLEN W. WARNER.....	895
The New Day Junior Mathematics. Book III. GEORGE E. HAWKINS.....	328
The Physical Basis of Things. GLEN W. WARNER.....	1008
The Story of Energy. CLARENCE RADIUS.....	782
The Universe of Light. GLEN W. WARNER.....	210
The World Around Us. IRA C. DAVIS.....	552
Trees and Shrubs of Minnesota. W. WHITNEY.....	784
Trees of North America. Vol. I. W. WHITNEY.....	104
Unit Mastery Mathematics. GEORGE E. HAWKINS.....	673
Wild Wings. GLEN W. WARNER.....	108
Bottle Drifts Seven Years on Long Sea Wonderings. SCIENCE SERVICE.....	751
Boy Scout Chemistry Merit Badge, Examiners for.....	301
Briquetting Coal Without a Binder.....	86
Business Arithmetic, A Proposed Course in. H. E. STELSON.....	91

C

Calculate by Eights Not by Tens. E. M. TINGLEY.....	395
Camping, an Important Part of a Childs Education in Elementary Science. WILLIAM GOULD VINAL.....	393

Cancellation—A Result and Not an Operation. MAY A. BLODGETT.....	558
Cancer, Sex, Vitamin and Drug Have Chemical Similarity. SCIENCE SERVICE	507
Central Association, A Thought for Members of the. GLEN W. WARNER...	121
Central Association of Science and Mathematics Teachers at Chicago, Ill., December 1 and 2, 1933. The Thirty-Third Convention of the. ROSS B. WYNNE.....	123
Address of Welcome. WILLIAM J. BOGAN.....	123
Response to the Address of Welcome. J. S. GEORGES.....	124
Biology Section. FRED R. PLATT.....	127
Chemistry Section. M. J. W. PHILLIPS.....	128
Elementary Science Section. FLORENCE G. BILLIG.....	129
General Science Section. LEONARD JOHNSON.....	129
Geography Section. VIVA DUTTON MARTIN.....	130
Mathematics Section.....	130
Physics Section. F. M. CARL.....	131
Annual Business Meeting.....	131
Report of the Necrology Committee. JAMES H. SMITH, Chairman.....	134
Report of the Conservation Committee. FRED SCHREIVER, Chairman.....	135
Chemical Equation, Amplifying the. EUGENE W. BLANK.....	941
Chemical Experiments, Some Supplementary. CHARLES H. STONE.....	923
Chemistry, An Objective Essay Examination in. AMOS G. HORNEY.....	380
Chemistry, Changing Trends in Teaching. WILHELM SEGERBLOM.....	524
Chemistry, Diagnostic Teaching of. FRANCIS W. HOWES.....	709
Chemistry, High School Industrial. E. G. PIERCE.....	246
Chemistry in America in 1850, Freshman. M. J. MCHENRY.....	11
Chemistry Teacher and the Reduced Budget, The. B. S. HOPKINS.....	172
Chemistry Test. H. K. MOORE.....	100
Chicago Mathematics Club Celebrates Twentieth Anniversary. JOSEPH J. URBANCEK.....	438
Clefts or "Canals" Discovered on Moon.....	786
Cockroaches. D. G. VEQUIST.....	595
College of Surgeons Supervises Care of Accident Victims. SCIENCE SERVICE	828
College Physics, A Nation-Wide Survey of First Year.....	108
Commission on the Training and Utilization of Advanced Students in Mathe- matics, Activities of the.....	306
Concave and Convex Lenses Take Place of Four Others, A Single Formula for the. A. V. PERSHING.....	929
Convection Currents, Demonstrating. OTTO R. ARIENS.....	862
Convention, Preview of the 1934. KATHARINE ULRICH.....	690
Copper Cures Sickness of Florida Orange Trees. SCIENCE SERVICE.....	222
Cosmic Rays, New Light on. RICHARD A. BETH.....	762
Curriculum Revision to Meet the Needs of High School Pupils. A. W. HURD	636

D

D'Arsonval Galvanometer, Measuring the Distance from Mirror to Scale on the. JULIAN L. THOMPSON.....	786
Davy Safety Lamp. LOUIS T. MASSON.....	437
Demonstration Experiments, Unusual. J. O. FRANK and GUY J. BARLOW...	72
Density Ball, The. LOUIS T. MASSON.....	635
Derivative of a Function, Concerning the. D. H. RICHERT.....	949
Dictionary, A New.....	723
Dimensionality. ERNEST P. LANE.....	295
Directed Numbers, Concrete Interpretations of. MERTON TAYLOR GOOD- RICH.....	623

E

Earth? How Old is the. W. T. SKILLING.....	617
Eastern Association of Physics Teachers, 125th Meeting. W. W. OBEAR....	193
Report of Committee on College Entrance Requirements. BURTON L. CUSHING.....	194
Report of Committee on Magazine Literature and New Books. C. W. STAPLES.....	194
Report of Committee on Current Events. J. P. BRENNAN.....	197

Address of Welcome: The Place of Science in Education. CLARENCE H. DEMPSEY.....	198
Report of New Apparatus Committee. ROBERT W. PERRY.....	200
Address: Electrons, Photons and Waves. PHILIP M. MORSE.....	200
Eastern Association of Physics Teachers, 126th Meeting. W. W. OBEAR.....	643
Report of Committee on Current Events. J. P. BRENNAN.....	644
Report of Committee on Magazine Literature and New Books. C. W. STAPLES.....	644
Address: Elementary Physics at the Massachusetts Institute of Technology. N. H. FRANK.....	649
Address: Two Pieces of New Apparatus. N. HENRY BLACK.....	657
Eastern Association of Physics Teachers, 127th Meeting.....	756
Report of the Treasurer 1933-1934. WILLIAM F. RICE.....	757
Annual Report of the Secretary. W. W. OBEAR.....	757
Address: Wave Motions and Inertia. A. W. DUFF.....	759
Address: Some Novelties in Light and Sound. ROBERT H. GODDARD.....	760
Address: New Light on Cosmic Rays. RICHARD A. BETH.....	762
Address: Determination of Stress Distribution in Engineering Materials by Means of the Photo-Elastic Method. M. L. PRICE.....	765
Address: New Apparatus for Lecture Demonstration of Wave Forms of Alternating Currents. H. H. NEWELL.....	766
Educational Measurement, A New Deal in.....	1014
Egg Cooked by Radio Waves from the Inside Out. SCIENCE SERVICE.....	824
Electro Chronograph for Laboratories, An. JOHN B. LEAKE.....	600
Electrolysis of Water. F. JOSEPH LORZ.....	811
Electrolytic Experiments in High School Chemistry. HAROLD J. ABRAHAMS.....	986
Electrons, Photons and Waves. PHILIP M. MORSE.....	200
Elementary Physics at the Massachusetts Institute of Technology. N. H. FRANK.....	649
Elementary School Science, Generalization in. G. W. HAUPT.....	574
Elementary Science in Iowa.....	25
Elementary Science, Program of the Meeting of the Council of Supervisors of.....	209
Energy Forms and Changes. H. R. FISHER.....	700
Engineering Education, Trend in. A. A. POTTER.....	58
Euclid's Elements. R. E. LANGER.....	412
Examinations in Physics I, June 1933, Final. A. H. GOULD.....	99

F

Failures? Why the. CARLTON D. BLANCHARD.....	660
Failures? Why the. W. F. ROECKER.....	207
Field Work in an Agricultural Area. CLINTON RICH.....	290
Flowers and Their Classification: Some Suggestions. ARTHUR M. JOHNSON.....	973
Free Materials, A New List of.....	330
Frequencies, A Device for Determining. A. W. STEWART.....	752
Fruit-Seed Relationship Through the Use of the Fruits of Wild Indigo, A Clearer Understanding of the. P. A. DAVIES.....	931

G

Galileo to Cosmic Rays, From—A Book Review. PHILIP A. CONSTANTINIDES.....	992
General Science, Applications Used for Improving Tests and Widening the Scope of. ROBERT B. COLVIN.....	945
General Science Can do for the High School Student, What. JOSEPH F. CONNELLY.....	235
General Science Project—Hydrogen. ARNOLD BOOKHEIM.....	777
General Science Test. J. W. GALBREATH.....	996
Geography in the High School, Organization of Materials for Teaching. ALICE FOSTER.....	477
Geology Field Trips in Illinois.....	499
Geometry, Remedial Classes in. JOSEPH A. NYBERG.....	853
Geometry's Tribute to Tradition. ELIZABETH B. COWLEY.....	266
"Giant" Oxygen Molecules Found Twice Normal Size.....	842
Giant Telescope Pouring Has Only One Slight Mishap. SCIENCE SERVICE.....	490

H

Heavens Would Look Different if We Could See Infrared Rays. SCIENCE SERVICE.....	143
Helium Discovered, New Kind of.....	900
High School and Community. OTIS W. CALDWELL.....	933
High School Mathematics, Contributions of the Period 1450-1650 to the Subject Matter of. GLADYS V. WORDEN.....	361
High School Physics, The Socialization of. R. B. DELANO.....	522
High Vacuum. M. N. STATES.....	251
Horner's Method, A Brief Note on. CECIL B. READ.....	466

I

I^N , A Method of Determining the Sign and Value of, Where I Equals $\sqrt{-1}$ and N is Any Rational Positive Integer Equal to, or Greater Than Two. L. R. POSEY.....	812
Imaginary Roots of the Quadratic Equation, Euclidean Construction for. J. SHAYLOR WOODRUFF.....	950
Instrument Measures Heat of Body Without Touching Skin, New. SCIENCE SERVICE.....	523
Integral Sided Right Triangles, Formulae for. FRED R. BROWN.....	21
Interference Fringes With Ordinary High School Apparatus, Easy Method of Exhibiting. A. V. PERSHING.....	841
Inventor's Institute Lists 895 Needed Inventions.....	985

J

Junior High School Mathematics, A Suggested Course of Study for. F. L. WREN and RUTH MONCREIFF.....	724
---	-----

L

Laboratory Suite, A.....	526
Laboratory Technique in Secondary Science Teaching, The. ORLIE M. CLEM and HENRY C. SHOUDY.....	603
Laws of Motion Apparatus, A New. HAROLD K. SCHILLING and DAVID EICKHOFF.....	34
Less Liver Damage When Oxygen Given With Ether and Chloroform.....	922
Light and Sound, Some Novelties in. ROBERT H. GODDARD.....	760
Lime Sulphur Spray. CHARLES H. STONE.....	513
Living Plants for Ecology and Physiology. EDWIN D. HULL.....	720
Long Range Camera Uses Mirrors Instead of Lens. SCIENCE SERVICE.....	968

M

Mathematicians Honored.....	595
Mathematics and Reality. CHARLES S. SLICHTER.....	240
Mathematics, Objective Testing in Secondary School. LAURA BLANK.....	702
Mathematics of the Orient, The. LOUIS C. KARPINSKI.....	467
McGraw-Hill Book Company Celebrates.....	713
Measurement of Outcomes of Instruction Other Than Information, The. PALMER O. JOHNSON.....	26
Meter Family, Some Members of the. ROSS MCCONNEHEY.....	186
Micro-Pipette, A Simple. THOMAS F. MORRISON.....	498
Micro-Projector, A Simple. JOHN R. HARRIS.....	532
Mimeoscope in Science Teaching, The. J. MORLEY NUTTING.....	714
More Children—Fewer Teachers.....	20
More Children—Less Money.....	49
Mosquitoes Enables Scientists to Study Pests, Pink. SCIENCE SERVICE.....	334

N

Nation Against Nation. RUSSELL WHITAKER.....	180
National Council of Teachers of Mathematics, Cleveland, Ohio, Feb. 23 and 24, 1934, The 15th Annual Meeting of the. EDWIN W. SCHREIBER.....	510
Natural Science, Demonstration Material in. GLEN W. WARNER.....	902

Natural Science in the Junior High School, A List of Objectives for Cultural.	
P. A. MAXWELL.....	875
Nature Trails, More. FRANKLIN R. MYERS.....	733
New Apparatus, Two Pieces of. N. HENRY BLACK.....	657
New Jersey Science Teachers' Association.....	90
Newton's Blind Apostle. SISTER M. THOMAS A'KEMPIS.....	569
Ninth Year Algebra, Typical Divisions of. JOSEPH J. NYBERG.....	743

O

Optical Phenomena, An Aid to the Study of. A. H. GINSBERG.....	38
Optical Systems, The Images of. R. C. COLWELL.....	460
Oxygen in the Air, The Percent of. WILBUR L. BEAUCHAMP.....	508

P

Physical Units, Some. ROSS MCCONNEHEY.....	250
Physics Teachers, Eastern Association of.....	122
Physics Teacher, The Goal of a. ARTHUR L. FOLEY.....	158
Piano Has no Strings and Uses Electrical Amplification, New. SCIENCE SERVICE.....	192
Picturesque Word Origins. GLEN W. WARNER.....	143
Plants' Stored Food Used Only for Growth in Length. SCIENCE SERVICE.....	220
Polarized Light, An Experiment With. ROBERT WILSON and WILLIAM KUNERTH.....	613
Political Geography in the High School, A Tentative Scheme for Teaching. KATHARINE CALLOWAY.....	388
Problem Department. G. H. JAMISON... 93, 212, 308, 431, 534, 664, 767, 883, 1000	1000
Problems for Recreation. CLARENCE RADIUS and WILLIAM VAN SANTEN....	87
Projects in Teaching Natural History Subjects, The Use of. W. WHITNEY..	457
Protein Builders Shown Necessary for Human Life, Two.....	622
Purest Water Weighs Twelve Parts Per Million Less Than Kind Man Drinks. SCIENCE SERVICE.....	985

Q

Quadratic Equations, An Approximate Solution of a System of. CECIL B. READ.....	942
---	-----

R

Radioactive Form of Copper Obtained by Bombarding Zinc With Neutrons. SCIENCE SERVICE.....	788
Regular Polygon Constructions in Certain Well-Known Geometry Texts, A Criticism of the Treatment of the. DEWEY C. DUNCAN.....	50
Research and the Scientific Method. M. LUCKIESH.....	411
Research for High School Students. CHARLES H. STONE.....	820
Respiration Ferments, Concerning. WERNER WENZELMANN. Translated by W. F. ROECKER.....	423
Review, A Critical Evaluation of. CARLETON A. MOOSE.....	528
Roots Grown in Culture Free From Tops of Plants. SCIENCE SERVICE.....	179

S

Salesmen of Knowledge. GLENN FRANK.....	459
School Textbooks.....	692
Science and Mathematics in Secondary Schools, Coordinating the Activities of the Departments of. E. R. BRESLICH.....	144
Science and Opinion. THOMAS W. GOSLING.....	913
Science in Education, The Place of. CLARENCE H. DEMPSEY.....	198
Science in the Elementary School, Why. JENNIE HALL.....	693
Science Mural. ROBERT L. BLACK.....	802
Science Questions. FRANKLIN T. JONES... 98, 206, 303, 426, 542, 659, 774, 890, 994	994
Science Teachers, Attention. JOHN H. MCCLELLAN.....	122
Science Teaching, Improved. ELLIOT R. DOWNING.....	589
Science Teaching, Looking Ahead in. CHARLES H. LAKE.....	136
Scientific Attitude and Skill in Thinking, The. ELLIOT R. DOWNING.....	302

Scientific Attitude, Is There Just One. GEORGE J. SKEWES.....	430
Scientific Method in Mathematics Classes, Teaching the. MAURICE L. HARTUNG.....	596
Scientific Method in the Classroom, The. ELLSWORTH S. OBOURN.....	969
Scientific Method? Is This the. IRA C. DAVIS.....	83
Scientific Method, Teaching:	
Article I. Testing Vacuum Bottles. HOMER W. LESOURD.....	234
Article II. Problems for Developing Skill in Scientific Thinking. ELLIOT R. DOWNING.....	400
Article III. The Percent of Oxygen in the Air. WILBUR L. BEAUCHAMP..	508
Article IV. Teaching the Scientific Method in Mathematics Classes. MAURICE L. HARTUNG.....	596
Article V. Why Science in the Elementary School. JENNIE HALL.....	693
Article VI. Teaching Scientific Methods. FRANCIS D. CURTIS.....	816
Article VII. The Scientific Method in the Classroom. ELLSWORTH S. OBOURN.....	969
Scientific Methods, Teaching. FRANCIS D. CURTIS.....	816
Scientific Method, The. GLEN W. WARNER.....	233
Scientific Method Used by the Layman in Typical Out-Of-School Situations, An Analysis of the Types of. RALPH K. WATKINS.....	804
Scientific Thinking, Problems for Developing Skill in. ELLIOT R. DOWNING..	400
Seasons, New Devices Used in the Teaching of the. HERMAN SCHLEIFER...	409
Sentence Worth Reading. GLEN W. WARNER.....	692
Siberian Teacher, The Great. GLEN W. WARNER.....	689
Sigma Zeta.....	755
Simple Harmonic Curves, A Demonstration Apparatus for the Composition of Two. E. G. PLASTERER.....	424
Solar System be Taught, Why and Where Should the. THEODOSIA HADLEY	405
Sound and Light.....	531
South African Grapes Enter U. S. Winter Market.....	1014
Special Spectacles Allow Divers to See Clearly Under Water. SCIENCE SERVICE.....	332
Squat, Fin-Backed Animal Reconstructed at American Museum. SCIENCE SERVICE.....	642
Starch Formation and Its Application, The Chemistry of. HENRY B. KELLOG	500
Stellar Looking-Glass Will Take Two Years to Complete, Huge. SCIENCE SERVICE.....	239
Stress Distribution in Engineering Materials by Means of the Photo-Elastic Method, Determination of. M. L. PRICE.....	765
Subtraction in Elementary Algebra, A Rational Presentation of. SUSIE B. FARMER.....	515
Sugaring Off, Another. WILLIAM VINAL.....	157
Sugaring-Off at Hudson, A. GLEN W. WARNER.....	392
Supplementary Problems List, A.....	671
Surface Tension Experiment, A New. OSCAR L. STARR.....	511
Surplus of Teachers? Is There a. GLEN W. WARNER.....	9
Symbol Spree, The. EARL C. REX.....	822

T

Teacher Organizations. GLEN W. WARNER.....	801
Teachers of Chemistry and Physics! Hear Ye.....	221
Teachers of Nature Study.....	110
Teaching Elementary Science, A Teacher's Approach to the Problems in. IRA C. DAVIS.....	275
Teaching of Science, Some Effects of the Depression Upon the. FRANCIS D. CURTIS.....	345
Telescope Making as a Project in High School Physics, Amateur. WILLARD GEER.....	76
Terraria and Their Plants. EDWIN D. HULL.....	372
Testing Movement in High School Biology, The. LEON NORDAU DIAMOND..	39
Tests of Classes in Physics. PAUL E. WILSON.....	891
Tests in Biology, Classroom. P. W. HOLADAY.....	187
Textile Printing and Dyeing Wastes Easily Made Harmless in Water. SCIENCE SERVICE.....	547

Three-Dimensional Graph, A Practical. FRANKLIN MILLER, JR.....	919
Torques, An Experiment on. M. H. TRYTTEN.....	823
Tuberculosis Found in Wild Moose.....	819

U

Ultraviolet Death Effects Differ According to Wavelengths. SCIENCE SERVICE	732
Uniform Circular Motion Again. G. B. BLAIR.....	593
United States Coast and Geodetic Survey, The. HELEN M. STRONG.....	843

V

Vacuum Bottles, Testing. HOMER W. LESOURD.....	234
Vitamin Necessary to Growth Discovered, New. SCIENCE SERVICE.....	514
Voices of Scientists Recorded for Future Cornell Students. SCIENCE SERVICE	622

W

Water Lens, The. LOUIS T. MASSON.....	699
Wave Forms of Alternating Currents, A New Apparatus for Lecture Demonstration of. H. H. NEWELL.....	766
Wave Motions and Inertia. A. W. DUFF.....	759
Wheat Not Liked by Grasshoppers, New Variety of. SCIENCE SERVICE.....	394
Wire Resistance, A Formula for. HOLLIS D. HATCH.....	332
Won By a Nose. WILLIAM R. WINICOV.....	865
Words to Confound the Physics Student. ROSS MCCONNEHEY.....	10
World's Fair Medical Exhibits is Step Toward American Museum of Hygiene, New Home for.....	957
World's Minerals, Control of the.....	334, 446

Y

Yeast Grows at Temperatures Below Freezing, New Found Strain of.....	874
Young Chicks Influenced by Temperature, Growth Rate of.....	944

INDEX BY AUTHORS

A

ABRAHAM, HAROLD J., Simon Gratz High School, Philadelphia, Pa.....	986
ANNING, NORMAN, University of Michigan, Ann Arbor, Mich.....	1002
ARIENS, OTTO R., Community High School, Mason City, Ill.....	862

B

BARLOW, GUY J., McKinley Jr. High School, Appleton, Wis.....	72
BEAUCHAMP, WILBUR L., University of Chicago, Chicago, Ill.....	508
BECKER, B. C., Woodriver, Ill.....	311
BELLARDO, JOHN E., St. Nazianz, Wis.....	432
BEMISDERFER, F. R., East Technical High School, Cleveland, Ohio.....	444
BETH, RICHARD A., Worcester Polytechnic Institute, Worcester, Mass.....	762
BILLIG, FLORENCE G., 4746 Second Blvd., Detroit, Mich.....	129
BLACK, N. HENRY, Harvard University, Cambridge, Mass.....	657
BLACK, ROBERT L., Emmerick Manual Training High School, Indianapolis, Ind.....	802
BLAIR, G. B., University of Nevada, Reno, Nev.....	593
BLANCHARD, CARLTON D., Norwich Free Academy, Norwich, Conn.....	660
BLANK, EUGENE W., Colgate-Palmolive-Peet Co., Jersey City, N. J.....	941
BLANK, LAURA, Hughes High School, Cincinnati, Ohio.....	702
BLODGETT, MAY A., 751 Goodrich Ave., St. Paul, Minn.....	558
BOGAN, WILLIAM J., Supt. of Schools, Chicago, Ill.....	123
BOOKHEIM, ARNOLD, Williamson Central School, Williamson, N. Y.....	776
BRENNAN, J. P., Somerville High School, Somerville, Mass.....	197, 644
BRESLICH, E. R., University of Chicago, Chicago, Ill.....	144
BROWN, FRED R., Pebble Hill School, Dewitt, N. Y.....	21
BRYAN, A. H., Baltimore City College, Baltimore, Md.....	609, 773
BUCHANAN, AARON, Brooklyn, N. Y.....	434, 668, 887

BUKER, W. E., Leetsdale, Pa..... 94, 311, 312, 315, 432, 534, 545, 886, 1002

C

CADWELL, F. A., St. Paul, Minn..... 536
 CALDWELL, OTIS W., Institute of School Experimentation, Columbia University, N. Y..... 933
 CALLOWAY, KATHARINE, Kelly High School, Chicago, Ill..... 388
 CARL, F. M., Collinwood High School, Cleveland, Ohio..... 131
 CHASE, SARA, Hirsch High School, Chicago, Ill..... 546
 CLEM, ORLIE M., Teachers College, Syracuse Univ., Syracuse, N. Y..... 603
 COLE, DONALD L., Seneca, Kan..... 958
 COLVIN, ROBERT B., Great Neck High School, Great Neck L. I. New York..... 79, 945
 COLWELL, R. C., West Virginia Univ., Morgantown, W. Va..... 460
 CONSTANTINIDES, PHILIP A., City College of Chicago, North Branch, Chicago, Ill..... 992
 COWLEY, ELIZABETH B., Pittsburgh, Pa..... 266
 CULTER, MARC, Brookline High School, Brookline, Mass..... 662
 CUNNINGHAM, BERT, Duke Univ., Durham, N. C..... 578
 CURTIS, FRANCIS D., Univ. of Michigan, Ann Arbor, Mich..... 345, 816
 CUSHING, BURTON L., East Boston High School, Boston, Mass..... 194

D

DALIDA, SANTOS, Rizal High School, Pasig, Rizal, P. I..... 995, 996
 DALTON, MARGIE, Hirsch High School, Chicago, Ill..... 662
 DAVIES, P. A., Univ. of Louisville, Louisville, Ky..... 931
 DAVIS, IRA C., Univ. of Wisconsin, Madison, Wis..... 83, 275, 550, 552
 DEFoe, O. K., St. Louis College of Pharmacy, St. Louis, Mo..... 313, 538
 DELANO, R. B., Memorial High School, Boston, Mass..... 522
 DEMPSEY, CLARENCE H., Supt. of Schools, Arlington, Mass..... 198
 DIAMOND, LEON NORDAU, Roosevelt High School, Washington, D. C..... 39
 DOWNING, ELLIOT R., Univ. of Chicago, Chicago, Ill..... 302, 400, 589
 DUFF, A. W., Worchester Polytechnic Institute, Worchester, Mass..... 759
 DUNCAN, DEWEY C., Univ. of California, Berkeley, Calif..... 50

E

EICKOFF, DAVID, Union College, Lincoln, Neb..... 34
 ESCOTT, E. B., Chicago, Ill..... 771

F

FARMER, SUSIE B., Central High School, Bridgeport, Conn..... 515
 FISHER, H. R., Sunbury High School, Sunbury, Ohio..... 700
 FOLEY, ARTHUR L., Indiana Univ., Bloomington, Ind..... 158
 FOSTER, ALICE, Univ. of Chicago, Chicago, Ill..... 477
 FOUNTAIN, L. F., Oak Park High School, Oak Park, Ill..... 325
 FRANCISCO, EUSTINO R., Rizal High School, Pasig, Rizal, P.I..... 996
 FRANK, GLENN, Univ. of Wisconsin, Madison, Wis..... 459
 FRANK, J. O., State Teachers College, Oshkosh, Wis..... 72
 FRANK, N. H., Massachusetts Institute of Technology, Cambridge, Mass... 649

G

GALBREATH, J. W., Lansdowne Jr. High School, East St. Louis, Ill..... 996
 GARDNER, FRANK, Brookline High School, Brookline, Mass..... 662
 GARFINKEL, BORIS, Buffalo, N. Y..... 214, 537, 769
 GEER, WILLARD, Reedley Joint Union High School, Reedley, Calif..... 76
 GEORGES, J. S., Wright City Jr. College, Chicago, Ill..... 124, 320, 548
 GINSBERG, A. J., R. Fuess, Inc., 245 West 55th St., New York, N. Y..... 38
 GODDARD, ROBERT H., Clark Univ., Worchester, Mass..... 760
 GONNELLY, JOSEPH F., Hyde Park High School, Chicago, Ill..... 235
 GOODRICH, MERTON TAYLOR, State Normal School, Keene, N. H..... 623
 GOSLING, THOMAS W., National Director, American Red Cross, Washington, D. C..... 913
 GOULD, A. H., Boys' Technical High School, Milwaukee, Wis..... 99
 GROTTIS, G. W., Irving, Ill..... 433

H

HADLEY, THEODOSIA, Western State Teachers College, Kalamazoo, Mich....	405
HALL, JENNIE, Minneapolis, Minn.....	693
HARRIS, JOHN R., Hiram College, Hiram, Ohio.....	532
HARTUNG, MAURICE L., Univ. High School, Madison, Wis.....	596
HATCH, HOLLIS D., English High School, Boston, Mass.....	332
HAUPT, G. W., State Teachers College, Westfield, Mass.....	574
HAUSWALD, WALTER E., Beardstown, Ill.....	546
HAWKINS, GEORGE E., Univ. High School, Chicago, Ill.....	328, 548, 673, 896
HEBB, L. E., Woodriver, Ill.....	311
HOLADAY, P. W., Shortridge High School, Indianapolis, Ind.....	187
HOPKINS, B. S., Univ. of Illinois, Urbana, Ill.....	172
HORNEY, AMOS G., Ohio State Univ., Columbus, Ohio.....	380
HOWES, FRANCIS W., Lindblom High School, Chicago, Ill.....	709
HULL, EDWIN D., Hull Botanical House, Gary, Ind.....	372, 720
HURD, A. W., Institute of School Experimentation, Columbia Univ., New York City.....	636

I

ISENBARGER, JEROME, Wright City Jr. College, Chicago, Ill.....	325, 326, 671
--	---------------

J

JAMISON, G. H., State Teachers College, Kirksville, Mo.....	93, 212, 308, 431, 534, 664, 767, 883, 1000
JOHN FELIX, Pittsburgh, Pa.....	309
JOHNSON, ARTHUR M., Univ. of California, Los Angeles, Calif.....	973
JOHNSON, LEONARD, Roosevelt Jr. High School, Cleveland, Ohio.....	129
JOHNSON, PALMER O., Univ. of Minnesota, Minneapolis, Minn.....	26
JONES, FRANKLIN T., 10109 Wilbur Ave., Cleveland, Ohio.....	98, 206, 303, 426, 542, 659, 774, 890, 994
JOSEPH MARGARET, Shorwood High School, Milwaukee, Wis.....	546

K

KARPINSKI, LOUIS G., Univ. of Michigan, Ann Arbor, Mich.....	467
KELLOG, HENRY B., 3240-103rd St., Corona, L. I., New York.....	500
KINNEY, J. M., South Side Jr. College, Chicago, Ill.....	326, 328, 330, 896, 898
KROUT, MAURICE, 4316 Lexington Ave., Chicago, Ill.....	108
KUNERTH, WILLIAM, Iowa State College, Ames, Iowa.....	613
KURTZ, FRANK, Hirsch High School, Chicago, Ill.....	663

L

LAKE, CHARLES H., Supt. of Schools, Cleveland, Ohio.....	136
LANE, ERNEST P., Univ. of Chicago, Chicago, Ill.....	295
LANGER, R. E., Univ. of Wisconsin, Madison, Wis.....	412
LEAKE, JOHN B., Crane Technical High School, Chicago, Ill.....	600
LEIFER, HERBERT R., Pittsburgh, Pa.....	216
LESOURD, HOMER W., Milton Academy, Milton, Mass.....	234
LINN, MARGUERITE, Lynwood, Calif.....	983
LORZ, F. JOSEPH, Monticello Jr. High School, Cleveland Heights, Ohio.....	811
LOUTHAN, CHARLES P., Columbus, Ohio.....	535
LUCKIESH, M., General Electric Co., Cleveland, Ohio.....	411
LUSTER, HENRY, Simon Gratz High School, Philadelphia, Pa.....	95

M

MACKAY, ROY, Portales, N. M.....	436, 534, 664, 771, 886, 1000
MACNEISH, A., Chicago, Ill.....	885
MARTIN, VIVA DUTTON, Arsenal Technical High School, Indianapolis, Ind....	130
MARX, VICTOR E., 330 S. Wells St., Chicago, Ill.....	284
MASSON, LOUIS T., Riverside High School, Buffalo, N. Y.....	437, 635, 699
MAXWELL, P. A., State Teachers College, Peru, Neb.....	875
McCLELLAN, JOHN H., Harrison Technical High School, Chicago, Ill.....	122
McCONNEHEY, ROSS.....	10, 71, 186, 250

McHENRY, M. J., Hendrix College, Conway, Ark.....	11
MIGUEL, HECTOR SAN, Rizal High School, Pasig, Rizal, P. I.....	996
MILLER, JR., FRANKLIN, St. Louis, Mo.....	919
MONCREIFF, RUTH, East Nashville High School, Nashville, Tenn.....	724
MOORE, H. K., Thos. A. Edison School, Cleveland, Ohio.....	100
MOOSE, CARLETON A., Milne High School, Albany, N. Y.....	528
MORRISON, THOMAS F., Milton Academy, Milton, Mass.....	498
MORSE, PHILIP M., Massachusetts Institute of Technology, Cambridge, Mass.....	200
MYERS, FRANKLIN R., Bernardo High School, Bernardsville, N. J.....	733

N

NEWELL, H. H., Worchester Polytechnical Institute, Worchester, Mass.....	766
NICHOLSON, NATHAN, South Philadelphia High School for Boys, Philadel- phia, Pa.....	94
NIXON, ALFRED F., Dunbar High School, Washington, D. C.....	967
NUTTING, J. MORLEY, Collinwood High School, Cleveland, Ohio.....	714
NYBERG, JOSEPH A., Hyde Park High School, Chicago, Ill.....	211, 323, 853

O

OBEAR, W. W., High School, Somerville, Mass.....	193, 643, 757
OBOURN, ELLSWORTH S., John Burroughs School, Clayton, Mo.....	969

P

PERRY, ROBERT W., Malden High School, Malden, Mass.....	200
PERSHING, A. V., Bloomington, Ind.....	841, 929
PHILLIPS, M. J. W., West Allis High School, West Allis, Wis.....	128
PHILLIPS, ROSE A., Freeport, Ill.....	900
PIERCE, E. G., East Technical High School, Cleveland, Ohio.....	246
PLASTERER, E. G., Huntington High School, Huntington, Ind.....	424
PLATT, FRED R., Harrison High School, Chicago, Ill.....	127
POSEY, L. R., Southern University, Baton Rouge, La.....	812
POTTER, A. A., Purdue University, Lafayette, Ind.....	58
PRICE, M. L., Worchester Polytechnical Institute, Worchester, Mass.....	765

R

RADIUS, CLARENCE, 236 West 109th Pl., Chicago, Ill.....	87, 323, 442, 782, 895
READ, CECIL B., Univ. of Wichita, Wichita, Kan.....	466, 667, 942
REX, EARL C., Grays Harbor Jr. College, Aberdeen, Wash.....	822
REYBURN, HARLAN, Petaluma, Calif.....	310
RICE, WILLIAM F., Jamaica Plain High School, Boston, Mass.....	757
RICH, CLINTON, 2472 Frederick Ave., Milwaukee, Wis.....	290
RICHERT, D. H., Bethel College, Newton, Kan.....	949
RODRIGUEZ, PRIMITIVA, Ragal High School, Pasig, Rizal, P. I.....	995, 996
ROECKER, W. F., Boys' Technical High School, Milwaukee, Wis.....	207, 423, 552
ROSE, EDGAR A., Rochester, N. Y.....	665
ROYCE, GEORGE L., J. Sterling Morton High School, Cicero, Ill.....	328, 784, 786

S

SCHILLING, HAROLD K., Union College, Lincoln, Neb.....	34
SCHLEIFER, HERMAN, James Monroe High School, New York, N. Y.....	409
SCHMIDT, ARTHUR W., Lead High School, Lead, S. D.....	678
SCHREIBER, EDWIN W., State Teachers College, Macomb, Ill.....	510
SCHREIVER, FRED, Boys' Technical High School, Milwaukee, Wis.....	135
SCHUETT, J. F., South Side Jr. College, Chicago, Ill.....	1010
SCIENCE SERVICE.....	143, 179, 192, 220, 222, 239, 283
332, 334, 394, 490, 507, 514, 523, 547, 622, 642, 732, 751, 788, 824, 828, 968, 985	
SEGERBLOM, WILHELM, Phillips Exeter Academy, Exeter, N. H.....	524
SHANNON, CLAUDE, Univ. of Michigan, Ann Arbor, Mich.....	1003
SHOUDY, HENRY C., North High School, Syracuse, N. Y.....	603
SILVERMAN, ELIOT, Brookline High School, Brookline, Mass.....	663
SKEWES, GEORGE J., University High School, Madison, Wis.....	430
SKILLING, W. T., State Teachers College, San Diego, Calif.....	617, 737, 825, 962
SLICHTER, CHARLES S., University of Wisconsin, Madison, Wis.....	240

SMITH, H. HANSEN, Battle Creek High School, Battle Creek, Iowa.....	315, 668
SMITH, JAMES H., Austin High School, Chicago, Ill.....	134
SMITH, W. R., Lewis Institute, Chicago, Ill.....	768
STAPLES, C. W., Chelsea High School, Chelsea, Mass.....	194, 644
STARR, OSCAR L., San Diego Army and Navy Academy, Pacific Beach, Calif.	511
STATES, M. N., Central Scientific Co., Chicago, Ill.....	251
STELSON, H. E., Kent State College, Kent, Ohio.....	91
STEWART, A. W., Kent State College, Kent, Ohio.....	752
STONE, CHARLES A., University High School, Chicago, Ill.....	324, 548
STONE, CHARLES H., Memorial High School for Boys, Boston, Mass.....	513, 820, 923
STORK, H. E., Carleton College, Northfield, Minn.....	473
STRAUSS, SAMUEL, Garfield High School, Akron, Ohio.....	543, 892
STRONG, HELEN M., Department of Commerce, Washington, D. C.....	843

T

TELLER, JAMES DAVID, Brighton High School, Wellington, Ohio.....	496
THOMAS A'KEMPIS, SISTER M., College of Saint Theresa, Winona, Minn....	569
THOMPSON, JULIAN L., Broadview Jr. College, LaGrange, Ill.....	786
TINGLEV, E. M., Oak Park, Ill.....	395
TRIGG, CHARLES W., Cummock College, Los Angeles, Calif.....	96, 213, 214, 305, 314, 316, 539, 540, 666, 667, 883, 888, 1001
TRYTTEN, M. H., Univ. of Pittsburgh, Johnstown Center, Johnstown, Pa....	823
TUCKER, F. G., Oberlin College, Oberlin, Ohio.....	319
TUER, J. E., Orillia, Ontario.....	1003
TURNER, HELEN S., Oak Park High School, Oak Park, Ill.....	672

U

ULRICH, KATHARINE, Oak Park-River Forest Twp. High School, Oak Park, Ill.	690, 803, 880
URBANCEK, JOSEPH J., Lane High School, Chicago, Ill.....	438, 743

V

VAN SANTEN, WILLIAM, Chicago, Ill.....	87
VEQUIST, D. G., Benton Jr.-Sr. High School, St. Joseph, Mo.....	595
VINAL, WILLIAM G., Western Reserve University, Cleveland, Ohio.....	157, 393, 464, 829

W

WADE, FRANK B., Shortridge High School, Indianapolis, Ind.	210, 442, 894, 895
WALTERS, MARGARET R., Los Angeles, Calif.....	848
WARNER, GLEN W., South Side Jr. College, Chicago, Ill.....	9, 103, 106, 108, 121, 122, 143, 210, 233, 318, 321, 322, 392, 440, 444
550, 554, 672, 673, 674, 689, 692, 778, 801, 893, 895, 902, 1006, 1008, 1010, 1011	
WARNER, LOWELL C., Bloomington, Ind.....	212
WATKINS, RALPH K., University of Missouri, Columbia, Mo.....	804
WEBB, NORMAN E., Western Reserve University, Cleveland, Ohio.....	829
WENZELMANN, WERNER, Germany.....	423
WHITAKER, RUSSELL, University of Wisconsin, Madison, Wis.....	180
WHITNEY, W., 5743 Dorchester Ave., Chicago, Ill.....	104, 457, 784, 1011
WILCOX, MARIE S., George Washington High School, Indianapolis, Ind.....	691
WILSON, PAUL E., Missoula County High School, Missoula, Mont.....	891, 968
WILSON, ROBERT, Iowa State College, Ames, Iowa.....	613
WINICOV, WILLIAM R., South Philadelphia High School, Philadelphia, Pa....	865
WOLFE, RICHARD, Lewis and Clark High School, Spokane, Wash.....	218
WOLTHORN, HENRY, Ohio State University, Columbus, Ohio.....	65
WOODRUFF, J. SHAYLOR, Abington High School, Abington, Pa.....	950
WORDEN, GLADYS V., West Winfield, N. Y.....	361
WREN, F. L., George Peabody College for Teachers, Nashville, Tenn.....	724
WRIGHTSTONE, J. WAYNE, Teachers College, Columbia Univ. New York City	491
WYNNE, ROSS B., South Side Jr. College, Chicago, Ill.....	123

Z

ZERBE, HOBSON M., Wilkesbarre, Pa.....	435
--	-----

